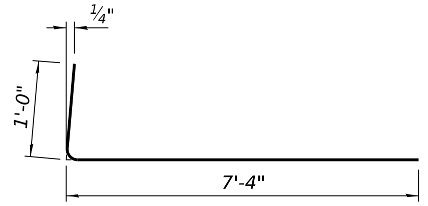
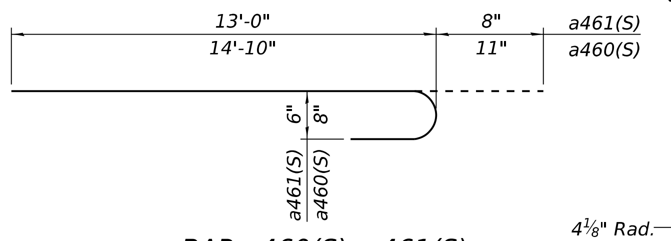
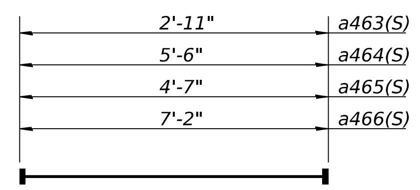


BAR a459(S)

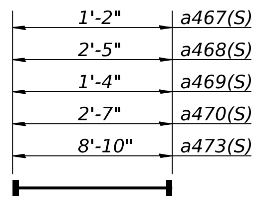


BAR a460(S), a461(S)



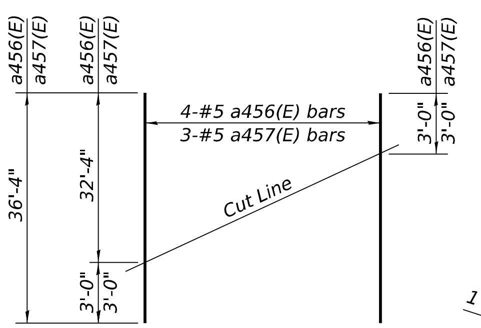
HEADED BAR a463(S), a464(S), a465(S), a466(S)

(Headed 4-#5 a463(S) Bar terminators)
(Headed 4-#5 a464(S) Bar terminators)
(Headed 14-#5 a465(S) Bar terminators)
(Headed 14-#5 a466(S) Bar terminators)



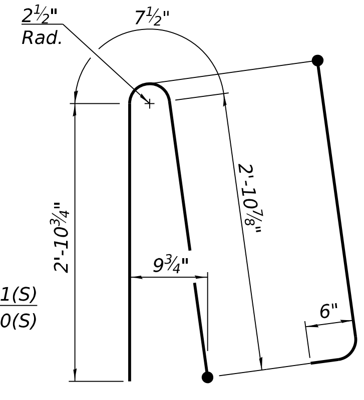
HEADED BAR a467(S), a468(S), a469(S), a470(S), a473(S)

(Headed 2-#5 a467(S) Bar terminators)
(Headed 2-#5 a468(S) Bar terminators)
(Headed 2-#5 a469(S) Bar terminators)
(Headed 2-#5 a470(S) Bar terminators)
(Headed 54-#6 a473(S) Bar terminators)

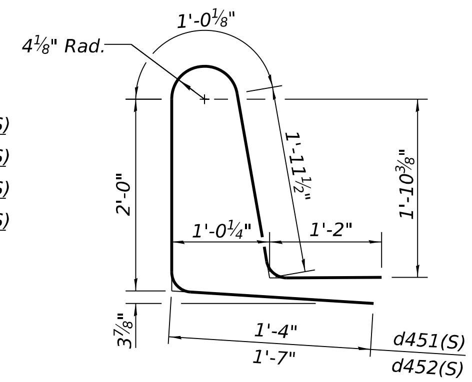


FIELD CUTTING DIAGRAM

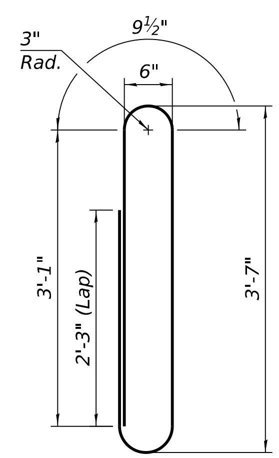
Order 3 thus for each bar full length. Cut as shown and use remainder of bars as shown in plan on sheet S-140



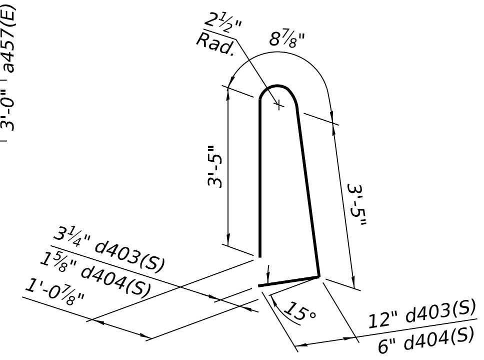
BAR d450(S)



BAR d451(S) & d452(S)

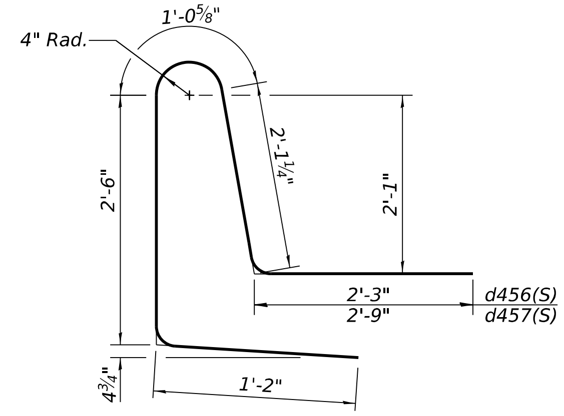


BAR d453(S)

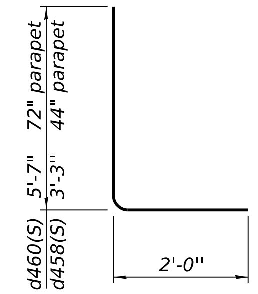


BAR d454(S) or d455(S)

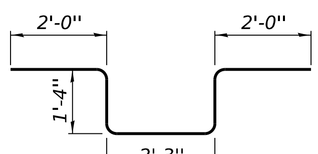
(Trimetric View)



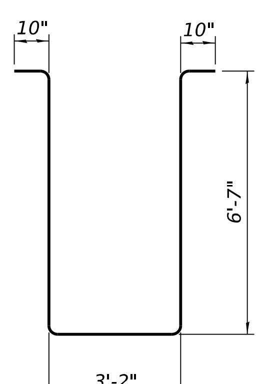
BAR d456(S) or d457(S)



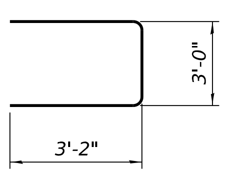
BAR d458(S) & d460(S)



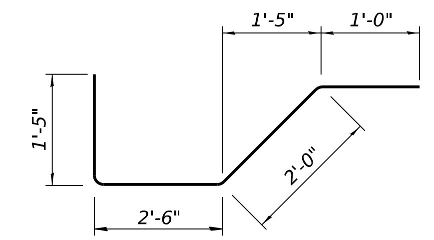
BAR d459(S)



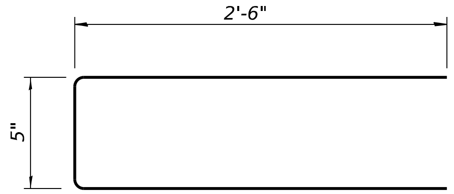
BAR s450(S)



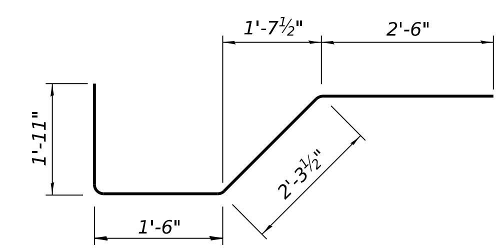
BAR s451(S)



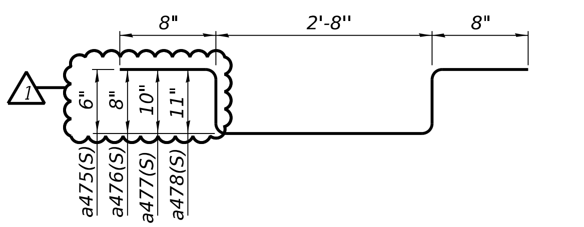
BAR x450(S)



BAR x451(S)



BAR x452(S)



BAR a475(S), a476(S), a477(S), a478(S)

UNIT 4 WB SUPERSTRUCTURE BILL OF MATERIAL

Bar	No.	Size	Length	Shape
a450(S)	1,452	#5	22'-3"	
a451(S)	1,520	#5	23'-10"	
a452(S)	1,392	#5	25'-10"	
a453(S)	726	#5	27'-8"	
a454(S)	759	#5	29'-8"	
a455(S)	699	#5	32'-5"	
a456(S)	12	#5	36'-4"	
a457(S)	9	#5	36'-4"	
a458(S)	21	#5	33'-4"	
a459(S)	1,102	#6	8'-4"	
a460(S)	412	#8	15'-9"	
a461(S)	684	#6	13'-8"	
a462(S)	36	#5	27'-6"	
a463(S)	2	#5	2'-11"	
a464(S)	2	#5	5'-6"	
a465(S)	7	#5	4'-7"	
a466(S)	7	#5	7'-2"	
a467(S)	1	#5	1'-2"	
a468(S)	1	#5	2'-5"	
a469(S)	1	#5	1'-4"	
a470(S)	1	#5	2'-7"	
a471(S)	3	#6	32'-3"	
a472(S)	16	#6	26'-10"	
a473(S)	27	#6	8'-10"	
a474(S)	80	#5	5'-0"	
a475(S)	1,188	#4	5'-0"	
a476(S)	1,833	#4	5'-4"	
a477(S)	241	#4	5'-8"	
a478(S)	195	#4	5'-10"	
b450(S)	291	#5	36'-1"	
b451(S)	564	#9	30'-10"	
b452(S)	776	#8	33'-8"	
b453(S)	194	#5	28'-9"	
b454(S)	291	#5	34'-9"	
b455(S)	316	#5	26'-0"	
b456(S)	790	#8	31'-8"	
b457(S)	512	#8	28'-7"	
b458(S)	79	#5	38'-3"	
b459(S)	316	#5	25'-0"	
b466(S)	280	#4	30'-0"	
d450(S)	692	#5	7'-0"	
d451(S)	413	#5	7'-6"	
d452(S)	279	#5	7'-9"	
d453(S)	1,096	#5	10'-0"	
d454(S)	412	#6	8'-7"	
d455(S)	684	#5	8'-1"	
d456(S)	684	#5	9'-1"	
d457(S)	412	#6	9'-7"	
d458(S)	6	#6	5'-3"	
d459(S)	22	#6	8'-11"	
d460(S)	3	#6	7'-7"	

1

Bar	No.	Size	Length	Shape
e450(S)	68	#4	18'-4"	
e451(S)	72	#4	19'-5"	
e452(S)	68	#4	18'-10"	
e453(S)	20	#4	28'-10"	
e454(S)	16	#4	31'-3"	
e455(S)	16	#4	35'-4"	
e456(S)	58	#6	18'-10"	
e457(S)	2	#8	18'-10"	
e458(S)	68	#6	19'-5"	
e459(S)	4	#8	19'-5"	
e460(S)	58	#6	17'-9"	
e461(S)	2	#8	17'-9"	
e462(S)	40	#6	36'-2"	
e463(S)	8	#8	37'-1"	
e464(S)	40	#6	32'-3"	
e465(S)	8	#8	33'-2"	
e466(S)	40	#6	34'-4"	
e467(S)	8	#8	35'-2"	
m450(S)	18	#6	4'-5"	
m451(S)	90	#6	6'-7"	
m452(S)	40	#5	4'-0"	
m453(S)	18	#6	5'-3"	
m454(S)	90	#6	7'-5"	
m455(S)	48	#5	3'-0"	
s450(S)	117	#5	18'-0"	
s451(S)	72	#5	9'-4"	
x450(S)	56	#5	6'-11"	
x451(S)	54	#5	5'-5"	
x452(S)	90	#5	8'-3"	
Concrete Superstructure			Cu Yd.	1,430.6
Reinforcement Bars, Stainless Steel			Pound	596,280
Bar Splicers			Each	184
Protective Coat			Sq. Yd.	4,636
Bridge Deck Grooving (Longitudinal)			Sq. Yd.	2,655
Diamond Grinding (Bridge Section)			Sq. Yd.	3,863

Note: Bar terminators paid for separately. See Total Bill of Materials.

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WSP USA Inc.
30 N. LASALLE STREET
SUITE 4200
CHICAGO, IL 60602
TEL: (312) 782-8150
FAX: (312) 782-1684

USER NAME = USGM717780	DESIGNED - LAS	REVISED - 1 01/30/2026
	CHECKED - PJL	REVISED -
PLOT SCALE = 6.000 ' / in.	DRAWN - BK	REVISED -
PLOT DATE = 1/27/2026	CHECKED - LAS	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SUPERSTRUCTURE DETAILS - UNIT 4 WB
STRUCTURE NUMBER 099-8309 WB AND 099-8325 EB

SHEET S-145 OF S-333 SHEETS

F.A.I RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
I-80	FAI 80 21 STRUCTURE 2	WILL	1230	726
		CONTRACT NO. 62R23		
	ILLINOIS	FED. AID PROJECT		

INTERIOR GIRDER MOMENT TABLE		0.4 Sp. 3 or 0.6 Sp. 5	Pier 3 or Pier 4	0.5 Sp. 4
I_s	(in⁴)	381,789	927,761	500,420
I_c (n)	(in⁴)	711,669	--	877,851
I_c (3n)	(in⁴)	531,054	--	664,814
I_c (cr)	(in⁴)	--	984,195	--
S_s	(in³)	7,047	12,976	9,511
S_c (n)	(in³)	8,743	--	11,300
S_c (3n)	(in³)	7,986	--	10,463
S_c (cr)	(in³)	--	14,263	--
S_x	(in³)	8,685	14,197	11,228
DC1	(k/')	1.77	2.31	1.94
M_{DC1}	('k)	8,282	26,462	13,246
DC2	(k/')	0.17	0.15	0.15
M_{DC2}	('k)	733	2,101	1,016
DW	(k/')	0.48	0.48	0.48
M_{DW}	('k)	2,296	6,476	3,292
LLDF		*	*	*
M_{LL+IM}	('k)	7,259	9,676	8,457
f_ℓ (Strength I)	(ksi)	--	--	--
** $M_u + \frac{1}{3} f_\ell S_x$	('k)	28,787	65,468	39,444
$\Phi_f M_n$	('k)	38,599	--	45,162
f_s DC1	(ksi)	14.1	24.5	16.7
f_s DC2	(ksi)	1.0	1.8	1.2
f_s DW	(ksi)	3.5	5.5	3.8
f_s (LL+IM)	(ksi)	10.0	8.1	9.0
f_ℓ (Service II)	(ksi)	-	-	-
$f_s + f_\ell/2$ (Service II)	(ksi)	31.6	42.3	33.4
Service II Resistance	(ksi)	47.5	54.7	47.5
** $f_s + f_\ell/3$ (Strength I)	(ksi)	-	58.0	-
$\Phi_f F_n$	(ksi)	-	68.4	-
V_f	(k)	82.1	99.5	62.8

EXTERIOR GIRDER MOMENT TABLE		0.4 Sp. 3 or 0.6 Sp. 5	Pier 3 or Pier 4	0.5 Sp. 4
I_s	(in⁴)	381,789	927,761	500,420
I_c (n)	(in⁴)	691,824	--	853,640
I_c (3n)	(in⁴)	519,126	--	651,303
I_c (cr)	(in⁴)	--	976,214	--
S_s	(in³)	7,047	12,976	9,511
S_c (n)	(in³)	8,674	--	11,220
S_c (3n)	(in³)	7,924	--	10,397
S_c (cr)	(in³)	--	14,079	--
S_x	(in³)	8,618	14,023	11,151
DC1	(k/')	1.68	2.22	1.85
M_{DC1}	('k)	8,287	26,384	13,173
DC2	(k/')	0.34	0.31	0.31
M_{DC2}	('k)	722	2,561	998
DW	(k/')	0.43	0.43	0.43
M_{DW}	('k)	2,239	6,186	3,210
LLDF		*	*	*
M_{LL+IM}	('k)	8,355	11,360	9,757
f_ℓ (Strength I)	(ksi)	-	-	-
** $M_u + \frac{1}{3} f_\ell S_x$	('k)	30,703	68,607	41,584
$\Phi_f M_n$	('k)	36,918	--	43,184
f_s DC1	(ksi)	14.1	24.4	16.6
f_s DC2	(ksi)	1.2	2.2	1.2
f_s DW	(ksi)	3.4	5.3	3.7
f_s (LL+IM)	(ksi)	11.6	9.7	10.4
f_ℓ (Service II)	(ksi)	-	-	-
$f_s + f_\ell/2$ (Service II)	(ksi)	33.8	44.5	35.0
Service II Resistance	(ksi)	47.5	55.3	47.5
** $f_s + f_\ell/3$ (Strength I)	(ksi)	-	61.0	-
$\Phi_f F_n$	(ksi)	-	68.4	-
V_f	(k)	69.0	94.5	68.7

Note: The analysis considers 2 scenarios: stresses resulting from the staged construction sequence and stresses assuming a single deck pour.

INTERIOR GIRDER REACTION TABLE		Pier 2 & Pier 5	Pier 3 & Pier 4
LLDF		*	*
OCF		--	--
R_{DC1}	(k)	173.7	759.3
R_{DC2}	(k)	11.7	52.9
R_{DW}	(k)	46.6	187.3
R_{LL}	(k)	120.2	287.4
R_{IM}	(k)	19.9	35.4
** R_{Total} (Strength I)(Impact)	(k)	574.2	1,954.2
** R_{Total} (Strength I)(No Impact)	(k)	537.6	1,889.1

EXTERIOR GIRDER REACTION TABLE		Pier 2 & Pier 5	Pier 3 & Pier 4
LLDF		*	*
OCF		--	--
R_{DC1}	(k)	174.1	755.0
R_{DC2}	(k)	29.7	102.9
R_{DW}	(k)	44.8	163.9
R_{LL}	(k)	128.9	296.5
R_{IM}	(k)	20.5	38.0
** R_{Total} (Strength I)(Impact)	(k)	612.6	1,998.8
** R_{Total} (Strength I)(No Impact)	(k)	574.9	1,929.0

* See LLDF Tables below

** Limit states for moment, stress, and reaction shown include a load modifier factor of 1.05 relating to operational classification for an essential bridge

EXTERIOR GIRDER LIVE LOAD + IMPACT DISTRIBUTION FACTORS

Span/Support	Positive Moment			Negative Moment			Shear			Reactions	Deflection
	1 Lane	Design	Fatigue	1 Lane	Design	Fatigue	1 Lane	Design	Fatigue	Design	Design
Pier 2 & 5	--	--	--	--	--	--	0.70	0.83	0.64	0.83	--
Spans 3 & 5	0.48	0.72	0.39	--	--	--	--	--	--	--	0.49
Piers 3 & 4	--	--	--	0.51	0.77	0.41	0.71	0.91	0.70	0.91	--
Span 4	0.47	0.71	0.37	--	--	--	--	--	--	--	0.49

INTERIOR GIRDER LIVE LOAD + IMPACT DISTRIBUTION FACTORS

Span/Support	Positive Moment			Negative Moment			Shear			Reactions	Deflection
	1 Lane	Design	Fatigue	1 Lane	Design	Fatigue	1 Lane	Design	Fatigue	Design	Design
Pier 2 & 5	--	--	--	--	--	--	0.57	0.77	0.49	0.77	--
Spans 3 & 5	0.38	0.63	0.30	--	--	--	--	--	--	--	0.49
Piers 3 & 4	--	--	--	0.41	0.66	0.34	0.53	0.81	0.55	0.81	--
Span 4	0.38	0.62	0.30	--	--	--	--	--	--	--	0.49

NOTES:

1. Moments and Reactions are for Interior Girder W2 and Exterior Girder W1.
2. Live load distribution for design was determined by a refined method of analysis.
3. The live load + impact distribution factors provided in the tables on this sheet were computed for HL-93 loading only, and are intended to be used to approximate HL-93 live load + impact demands.
4. The live load + impact distribution factors are in the form of a ratio of the girder live load demand obtained from the refined method of analysis caused by HL-93 loading, divided by the girder live load demand obtained from the application of a single lane of HL-93 loading acting on a single isolated girder.
5. Example calculation of exterior girder live load design moment in Span 3 based on the distribution factors provided in the tables:

   A. From a line girder analysis with a distribution factor of 1.0 lane, the live load moment at Span 3 is found to be:

   M_{LL+IM} = 11,614 k-ft per lane

   B. From the Exterior Girder Live Load + Impact Distribution Factor table shown on this sheet, the design distribution factor for positive moment in Span 3 is 0.72. Therefore, the live load + impact moment at Span 3 based on the refined method of analysis is:

   0.72 x 11,614 k-ft = 8,355 k-ft

I_s, S_s: Non-composite moment of inertia and section modulus of the steel section used for computing f_s (Total-Strength I, and Service II) due to non-composite dead loads (in.⁴ and in.³).

I_c (n), S_c (n): Composite moment of inertia and section modulus of the steel and deck based upon the modular ratio, "n", used for computing f_s (Total-Strength I, and Service II) in uncracked sections due to short-term composite live loads (in.⁴ and in.³).

I_c (3n), S_c (3n): Composite moment of inertia and section modulus of the steel and deck based upon 3 times the modular ratio, "3n", used for computing f_s (Total-Strength I, and Service II) in uncracked sections, due to long-term composite (superimposed) dead loads (in.⁴ and in.³).

I_c (cr), S_c (cr): Composite moment of inertia and section modulus of the steel and longitudinal deck reinforcement, used for computing f_s (Total-Strength I and Service II) in cracked sections, due to both short-term composite live loads and long-term composite (superimposed) dead loads (in.⁴ and in.³).

S_x: Section modulus about the major axis of a section to the controlling flange, tension or compression, taken as yield moment with respect to the controlling flange over the yield strength of the controlling flange (in.³).

DC1: Un-factored non-composite dead load (kips/ft.).

M_{DC1}: Un-factored moment due to non-composite dead load (kip-ft.).

DC2: Un-factored long-term composite (superimposed excluding future wearing surface) dead load (kips/ft.).

M_{DC2}: Un-factored moment due to long-term composite (superimposed excluding future wearing surface) dead load (kip-ft.).

DW: Un-factored long-term composite (superimposed future wearing surface only) dead load (kips/ft.).

M_{DW}: Un-factored moment due to long-term composite (superimposed future wearing surface only) dead load (kip-ft.).

LLDF: Live Load Distribution Factor for moment and shear computed according to Article 4.6.2.2 and further IDOT provisions.

M_{LL+IM}: Un-factored live load moment plus dynamic load allowance (impact) (kip-ft.).

M_u: Strength I load combination of factored design moments (kip-ft.). $1.25\,(M_{DC1} + M_{DC2}) + 1.5\,M_{DW} + 1.75\,M_{LL+IM}$

f_ℓ: Factored calculated flange lateral bending stress as calculated using Article 6.10.1.6 and as further simplified by IDOT provisions (ksi).

$\Phi_f M_n$: Factored nominal flexural resistance of the section determined as specified in Article 6.10.7.1 or A6 as applicable (kip-ft.).

f_s DC1: Un-factored stress at edge of flange for controlling steel flange due to vertical non-composite dead loads as calculated below (ksi). M_{DC1} / S_s

f_s DC2: Un-factored stress at edge of flange for controlling steel flange due to vertical composite dead loads as calculated below (ksi). M_{DC2} / S_c (3n) or M_{DC2} / S_c (cr) as applicable.

f_s DW: Un-factored stress at edge of flange for controlling steel flange due to vertical composite future wearing surface loads as calculated below (ksi). M_{DW} / S_c (3n) or M_{DW} / S_c (cr) as applicable.

f_s (LL + IM): Un-factored stress at edge of flange for controlling steel flange due to vertical composite live load plus impact loads as calculated below (ksi). M_{LL+IM} / S_c (n) or M_{LL+IM} / S_c (cr) as applicable.

$f_s + f_\ell / 2$ (Service II): Sum of stresses as computed below (ksi). f_s DC1 + f_s DC2 + f_s DW + 1.3 f_s (LL + IM) + f_ℓ /2

Service II Resistance: Composite ($0.95 R_h F_{yf}$) or noncomposite ($0.80 R_h F_{yf}$) stress capacity according to Article 6.10.4.2 (ksi).

$f_s + f_\ell / 3$ (Strength I): Sum of stresses as computed below on non-compact sections (ksi). 1.25 (f_s DC1 + f_s DC2) + 1.5 f_s DW + 1.75 f_s (LL + IM) + f_ℓ /3

$\Phi_f F_n$: Factored nominal flexural resistance of the section as specified in Article 6.10.7.2 or 6.10.8 as applicable (ksi).

V_f: Maximum factored shear range in span computed according to Article 6.10.10.

OCF: Obtuse Correction Factor according to Article 4.6.2.2.3c or as further simplified by IDOT provisions.

R_{DC1}: Un-factored reaction due to non-composite dead load (kip).

R_{DC2}: Un-factored reaction due to long-term composite (superimposed excluding future wearing surface) dead load (kip).

R_{DW}: Un-factored reaction due to long-term composite (superimposed future wearing surface only) dead load (kip).

R_{LL}: Un-factored live load reaction (kip).

R_{IM}: Un-factored dynamic load allowance (impact) (kip).

R_{Total} (Strength I)(Impact): Strength I load combination of factored design reactions (kip). $1.25\,(R_{DC1} + R_{DC2}) + 1.5 R_{DW} + 1.75\,(R_{LL} + R_{IM})$

R_{Total} (Strength I)(No Impact): Strength I load combination of factored design reactions, not including dynamic load allowance (Impact) (kip). $1.25\,(R_{DC1} + R_{DC2}) + 1.5 R_{DW} + 1.75\,(R_{LL})$

INTERIOR GIRDER MOMENT TABLE		0.4 Sp. 3 or 0.6 Sp. 5	Pier 3 or Pier 4	0.5 Sp. 4
I_s	(in⁴)	381,789	927,761	500,420
I_c (n)	(in⁴)	711,669	--	877,851
I_c (3n)	(in⁴)	531,054	--	664,814
I_c (cr)	(in⁴)	--	984,195	--
S_s	(in³)	7,047	12,976	9,511
S_c (n)	(in³)	8,743	--	11,300
S_c (3n)	(in³)	7,986	--	10,463
S_c (cr)	(in³)	--	14,263	--
S_x	(in³)	8,684	14,196	11,229
DC1	(k/')	1.77	2.31	1.94
M_{DC1}	('k)	8,368	26,591	13,087
DC2	(k/')	0.17	0.15	0.15
M_{DC2}	('k)	980	2,077	902
DW	(k/')	0.48	0.48	0.48
M_{DW}	('k)	2,308	6,427	3,243
LLDF		*	*	*
M_{LL+IM}	('k)	7,141	9,676	8,375
f_ℓ (Strength I)	(ksi)	--	--	--
** $M_u + \frac{1}{3} f_\ell S_x$	('k)	29,026	65,529	38,857
$\Phi_f M_n$	('k)	38,599	--	45,162
f_s DC1	(ksi)	14.3	24.6	16.5
f_s DC2	(ksi)	1.1	1.8	1.0
f_s DW	(ksi)	3.5	5.4	3.7
f_s (LL+IM)	(ksi)	9.8	8.1	8.9
f_ℓ (Service II)	(ksi)	-	-	-
$f_s + f_\ell/2$ (Service II)	(ksi)	31.9	42.3	32.8
Service II Resistance	(ksi)	47.5	54.7	47.5
** $f_s + f_\ell/3$ (Strength I)	(ksi)	-	58.0	-
$\Phi_f F_n$	(ksi)	-	68.4	-
V_f	(k)	82.6	99.1	62.8

EXTERIOR GIRDER MOMENT TABLE		0.4 Sp. 3 or 0.6 Sp. 5	Pier 3 or Pier 4	0.5 Sp. 4
I_s	(in⁴)	381,789	927,761	500,420
I_c (n)	(in⁴)	691,824	--	853,640
I_c (3n)	(in⁴)	519,126	--	651,303
I_c (cr)	(in⁴)	--	976,214	--
S_s	(in³)	7,047	12,976	9,511
S_c (n)	(in³)	8,674	--	11,220
S_c (3n)	(in³)	7,924	--	10,397
S_c (cr)	(in³)	--	14,079	--
S_x	(in³)	8,617	14,023	11,152
DC1	(k/')	1.68	2.22	1.85
M_{DC1}	('k)	8,383	26,191	13,055
DC2	(k/')	0.34	0.31	0.31
M_{DC2}	('k)	1,060	2,506	893
DW	(k/')	0.43	0.43	0.43
M_{DW}	('k)	2,249	6,133	3,163
LLDF		*	*	*
M_{LL+IM}	('k)	8,196	11,193	9,594
f_ℓ (Strength I)	(ksi)	--	--	--
** $M_u + \frac{1}{3} f_\ell S_x$	('k)	30,996	67,891	40,917
$\Phi_f M_n$	('k)	36,918	--	43,184
f_s DC1	(ksi)	14.3	24.2	16.5
f_s DC2	(ksi)	1.6	2.1	1.0
f_s DW	(ksi)	3.4	5.1	3.7
f_s (LL+IM)	(ksi)	11.3	9.5	10.3
f_ℓ (Service II)	(ksi)	-	-	-
$f_s + f_\ell/2$ (Service II)	(ksi)	33.6	44.0	34.5
Service II Resistance	(ksi)	47.5	55.3	47.5
** $f_s + f_\ell/3$ (Strength I)	(ksi)	-	60.0	-
$\Phi_f F_n$	(ksi)	-	68.4	-
V_f	(k)	69.0	94.5	68.7

Note: The analysis considers 2 scenarios: stresses resulting from the staged construction sequence and stresses assuming a single deck pour.

INTERIOR GIRDER REACTION TABLE		Pier 2 & Pier 5	Pier 3 & Pier 4
LLDF		*	*
OCF		--	--
R_{DC1}	(k)	173.7	759.3
R_{DC2}	(k)	11.7	52.9
R_{DW}	(k)	46.6	187.3
R_{LL}	(k)	120.2	287.4
R_{IM}	(k)	19.9	35.4
** R_{Total} (Strength I)(Impact)	(k)	574.2	1,954.2
** R_{Total} (Strength I)(No Impact)	(k)	537.6	1,889.1

EXTERIOR GIRDER REACTION TABLE		Pier 2 & Pier 5	Pier 3 & Pier 4
LLDF		*	*
OCF		--	--
R_{DC1}	(k)	174.1	755.0
R_{DC2}	(k)	29.7	102.9
R_{DW}	(k)	44.8	163.9
R_{LL}	(k)	128.9	296.5
R_{IM}	(k)	20.5	38.0
** R_{Total} (Strength I)(Impact)	(k)	612.6	1,998.8
** R_{Total} (Strength I)(No Impact)	(k)	574.9	1,929.0

* See LLDF Tables on sheet S-213

** Limit states for moment, stress, and reaction shown include a load modifier factor of 1.05 relating to operational classification for an essential bridge

NOTES:

1. Moments and Reactions are for Interior Girder E7 and Exterior Girder E8.
2. Live load distribution for design was determined by a refined method of analysis.
3. The live load + impact distribution factors provided in the tables on this sheet were computed for HL-93 loading only, and are intended to be used to approximate HL-93 live load + impact demands.
4. The live load + impact distribution factors are in the form of a ratio of the girder live load demand obtained from the refined method of analysis caused by HL-93 loading, divided by the girder live load demand obtained from the application of a single lane of HL-93 loading acting on a single isolated girder.
5. Example calculation of exterior girder live load design moment in Span 3 based on the distribution factors provided in the tables:

   A. From a line girder analysis with a distribution factor of 1.0 lane, the live load moment at Span 3 is found to be:

   M_{LL+IM} = 11,838 k-ft per lane

   B. From the Exterior Girder Live Load + Impact Distribution Factor table shown on this sheet, the design distribution factor for positive moment in Span 3 is 0.72. Therefore, the live load + impact moment at Span 3 based on the refined method of analysis is:

   0.72 x 11,838 k-ft = 8,196 k-ft

I_s, S_s: Non-composite moment of inertia and section modulus of the steel section used for computing f_s (Total-Strength I, and Service II) due to non-composite dead loads (in.⁴ and in.³).

I_c (n), S_c (n): Composite moment of inertia and section modulus of the steel and deck based upon the modular ratio, "n", used for computing f_s (Total-Strength I, and Service II) in uncracked sections due to short-term composite live loads (in.⁴ and in.³).

I_c (3n), S_c (3n): Composite moment of inertia and section modulus of the steel and deck based upon 3 times the modular ratio, "3n", used for computing f_s (Total-Strength I, and Service II) in uncracked sections, due to long-term composite (superimposed) dead loads (in.⁴ and in.³).

I_c (cr), S_c (cr): Composite moment of inertia and section modulus of the steel and longitudinal deck reinforcement, used for computing f_s (Total-Strength I and Service II) in cracked sections, due to both short-term composite live loads and long-term composite (superimposed) dead loads (in.⁴ and in.³).

S_x: Section modulus about the major axis of a section to the controlling flange, tension or compression, taken as yield moment with respect to the controlling flange over the yield strength of the controlling flange (in.³).

DC1: Un-factored non-composite dead load (kips/ft.).

M_{DC1}: Un-factored moment due to non-composite dead load (kip-ft.).

DC2: Un-factored long-term composite (superimposed excluding future wearing surface) dead load (kips/ft.).

M_{DC2}: Un-factored moment due to long-term composite (superimposed excluding future wearing surface) dead load (kip-ft.).

DW: Un-factored long-term composite (superimposed future wearing surface only) dead load (kips/ft.).

M_{DW}: Un-factored moment due to long-term composite (superimposed future wearing surface only) dead load (kip-ft.).

LLDF: Live Load Distribution Factor for moment and shear computed according to Article 4.6.2.2 and further IDOT provisions.

M_{LL+IM}: Un-factored live load moment plus dynamic load allowance (impact) (kip-ft.).

M_u: Strength I load combination of factored design moments (kip-ft.). $1.25\ (M_{DC1} + M_{DC2}) + 1.5\ M_{DW} + 1.75\ M_{LL+IM}$

f_ℓ: Factored calculated flange lateral bending stress as calculated using Article 6.10.1.6 and as further simplified by IDOT provisions (ksi).

$\Phi_f M_n$: Factored nominal flexural resistance of the section determined as specified in Article 6.10.7.1 or A6 as applicable (kip-ft.).

f_s DC1: Un-factored stress at edge of flange for controlling steel flange due to vertical non-composite dead loads as calculated below (ksi). M_{DC1} / S_s

f_s DC2: Un-factored stress at edge of flange for controlling steel flange due to vertical composite dead loads as calculated below (ksi). M_{DC2} / S_c (3n) or M_{DC2} / S_c (cr) as applicable.

f_s DW: Un-factored stress at edge of flange for controlling steel flange due to vertical composite future wearing surface loads as calculated below (ksi). M_{DW} / S_c (3n) or M_{DW} / S_c (cr) as applicable.

f_s (LL + IM): Un-factored stress at edge of flange for controlling steel flange due to vertical composite live load plus impact loads as calculated below (ksi). M_{LL+IM} / S_c (n) or M_{LL+IM} / S_c (cr) as applicable.

$f_s + f_\ell / 2$ (Service II): Sum of stresses as computed below (ksi). f_s DC1 + f_s DC2 + f_s DW + 1.3 f_s (LL + IM) + f_ℓ /2

Service II Resistance: Composite ($0.95 R_h F_{yf}$) or noncomposite ($0.80 R_h F_{yf}$) stress capacity according to Article 6.10.4.2 (ksi).

$f_s + f_\ell / 3$ (Strength I): Sum of stresses as computed below on non-compact sections (ksi). 1.25 (f_s DC1 + f_s DC2) + 1.5 f_s DW + 1.75 f_s (LL + IM) + f_ℓ /3

$\Phi_f F_n$: Factored nominal flexural resistance of the section as specified in Article 6.10.7.2 or 6.10.8 as applicable (ksi).

V_f: Maximum factored shear range in span computed according to Article 6.10.10.

OCF: Obtuse Correction Factor according to Article 4.6.2.2.3c or as further simplified by IDOT provisions.

R_{DC1}: Un-factored reaction due to non-composite dead load (kip).

R_{DC2}: Un-factored reaction due to long-term composite (superimposed excluding future wearing surface) dead load (kip).

R_{DW}: Un-factored reaction due to long-term composite (superimposed future wearing surface only) dead load (kip).

R_{LL}: Un-factored live load reaction (kip).

R_{IM}: Un-factored dynamic load allowance (impact) (kip).

R_{Total} (Strength I)(Impact): Strength I load combination of factored design reactions (kip). $1.25\ (R_{DC1} + R_{DC2}) + 1.5 R_{DW} + 1.75\ (R_{LL} + R_{IM})$

R_{Total} (Strength I)(No Impact): Strength I load combination of factored design reactions, not including dynamic load allowance (Impact) (kip). $1.25\ (R_{DC1} + R_{DC2}) + 1.5 R_{DW} + 1.75\ (R_{LL})$